

CLAIMS

1. A method for generating a high-velocity cutting jet comprises the steps of forming a high-velocity jet of a liquid, forming a suspension of an abrasive material in a carrier gas comprising a condensable vapour, and so entraining the suspension of abrasive material into the liquid jet that at least part of the vapour condenses to produce a jet of a mixture comprising abrasive material and liquid.
2. A method as claimed in claim 1, wherein the suspension of abrasive material in carrier gas is provided at above ambient pressure.
3. A method as claimed in either claim 1 or claim 2, wherein said condensation of the vapour produces a pressure close to ambient pressure.
4. A method as claimed in any one of the preceding claims, wherein the carrier gas also comprises a gas that is not condensable when entrained into the liquid jet, such as air.
5. A method as claimed in any one of the preceding claims, wherein said vapour is condensable to form said liquid.
6. A method as claimed in any one of the preceding claims, wherein the liquid comprises water.
7. A method as claimed in any one of the preceding claims, wherein the condensable vapour comprises steam, optionally dry or superheated steam.

8. A method as claimed in any one of the preceding claims, wherein the entrainment step is performed at least partially within a restricted bore of a nozzle means, optionally substantially within said bore.
9. A method as claimed in claim 8, wherein the entrainment step performed at least partially within chamber means traversed by the liquid jet before entering said nozzle means.
10. A method as claimed in any one of the preceding claims, comprising the further step of introducing condensable vapour and/or non-condensable gas into the liquid jet subsequently to the entrainment of the abrasive suspension.
11. Apparatus for generating a high-velocity cutting jet, comprising means to form a high-velocity jet of liquid, means to form a suspension of an abrasive material in a carrier gas comprising a condensable vapour, and means to entrain said suspension into the jet of liquid so that at least part of the vapour condenses to produce a jet of a mixture comprising abrasive material and liquid.
12. Apparatus as claimed in claim 11, wherein the liquid comprises water.
13. Apparatus as claimed in either claim 11 or claim 12, wherein the condensable vapour comprises steam, optionally dry steam.
14. Apparatus as claimed in any one of claims 11 to 13, wherein the carrier gas also comprises a gas that is not condensable when entrained into the liquid jet, such as air.

15. Apparatus as claimed in any one of claims 11 to 14, wherein the liquid jet forming means comprises a source of liquid under pressure so connected to restricted orifice means that the liquid is projected therefrom as a high-velocity jet.
16. Apparatus as claimed in claim 15, provided with nozzle means having an elongate bore extending between an inlet and outlet thereof and so substantially aligned with the liquid jet projected from the orifice means that said jet may pass therethrough.
17. Apparatus as claimed in claim 16, wherein the nozzle means comprises a substantially parallel-sided bore.
18. Apparatus as claimed in claim 16, wherein the nozzle means comprises a bore tapering between the inlet and the outlet of the nozzle means.
19. Apparatus as claimed in any one of claims 16 to 18, wherein the nozzle means comprises a plurality of nozzle sections, a bore of each said nozzle section being substantially aligned with the liquid jet.
20. Apparatus as claimed in any one of claims 16 to 19, wherein means is provided to introduce one or more flows of said condensable vapour and/or non-condensable gas into the nozzle means intermediate of the inlet and outlet thereof.
21. Apparatus as claimed in any one of claims 16 to 20, provided with chamber means disposed between the orifice means and the nozzle means, which is traversed by the

liquid jet and into which the suspension of abrasive material in carrier gas is passed so as to be entrained into the liquid jet.

22. Apparatus as claimed in claim 21, provided with a frustoconical transition zone connecting the chamber means to the inlet of the nozzle means.
23. Apparatus as claimed in any one of claims 11 to 22, wherein the means to form a suspension of abrasive material in a carrier gas comprises means to generate a flow of said condensable vapour, a supply of abrasive material and means to meter the abrasive material into said flow.